

1 **WHAT IS CLAIMED IS:**

2 1. A multi-window monitoring system, comprising:

3 a data collection assembly (10) having

4 an assembly controller (11);

5 a memory device (111) connected to the assembly controller (11);

6 multiple ultrasonic signal transceivers (20);

7 multiple signal processing circuits (21) connected to the assembly

8 controller (11) and respectively to the ultrasonic signal transceivers (20); and

9 a wireless signal transmitter (12) connected to the assembly controller

10 (11);

11 a console unit (30) having

12 a unit controller (31);

13 a signal receiver (32);

14 an alarm (33); and

15 an image overlay controller (40) that has multiple video input

16 terminals, a data input terminal connected to the unit controller (31) and an video

17 output terminal;

18 multiple video cameras (50) connected respectively to the video input

19 terminals of the image overlay controller (40); and

20 a monitor (60) connected to the video output terminal of the image overlay

21 controller (40) and having a touch-screen with multiple function keys.

22 2. The multi-window monitoring system according to claim 1, wherein the

23 image overlay controller (40) comprises:

24 a programmable video controller (41) being connected to a temporary

1 memory (411);

2 a multiplexer (42), which is connected to the programmable video
3 controller (41) and the temporary memory (411) through an A/D signal
4 converter (421) and a horizontal-sync signal separation circuit (422);

5 a buffer (43) connected to an input terminal of the programmable video
6 controller (41); and

7 a D/A converter (44), which is connected between the programmable video
8 controller (41) and the monitor (60) to convert images to single-channel or
9 multiple-channel video images and pass the converted images to the monitor (60)
10 for display.

11 3. The multi-window monitoring system according to claim 1, wherein
12 the assembly controller (11) of the console assembly (10) connects to a
13 memory device (111) that saves identification codes of all ultrasonic signal
14 transceivers (20);

15 each ultrasonic module (20) is connected to the assembly controller (11)
16 through a signal processing circuit (21), so that ultrasonic signals returned from
17 the ultrasonic signal transceivers (20) are digitized and passed to the assembly
18 controller (11); and

19 the wireless signal transmitter is a RF signal transmission module that
20 utilizes a frequency hopping technique or a frequency spreading technique to
21 avoid mutual interference.

22 4. The multi-window monitoring system according to claim 3, wherein the
23 signal processing circuit (21) comprises a microprocessor (211), an ultrasonic
24 signal transceiving circuit (212), a signal amplifier (213) and a signal converting

1 circuit (214), where the microprocessor (211) is connected to the assembly
2 controller (11) for passing on digitized signals.

3 5. The multi-window monitoring system according to claim 1, wherein the
4 unit controller (31) is connected to a memory device (311) for saving
5 identification codes of all ultrasonic signal transceivers (20), wherein the signal
6 receiver (32) is a RF signal transmission module.

7 6. The multi-window monitoring system according to claim 2, wherein the
8 unit controller (31) is connected to a memory device (311) for saving
9 identification codes of all ultrasonic signal transceivers (20), wherein the signal
10 receiver (32) is a RF signal transmission module.

11 7. The multi-window monitoring system according to claim 3, wherein the
12 unit controller (31) is connected to a memory device (311) for saving
13 identification codes of all ultrasonic signal transceivers (20), wherein the signal
14 receiver (32) is a RF signal transmission module.

15 8. The multi-window monitoring system according to claim 4, wherein the
16 unit controller (31) is connected to a memory device (311) for saving
17 identification codes of all ultrasonic signal transceivers (20), wherein the signal
18 receiver (32) is a RF signal transmission module.

19 9. The multi-window monitoring system according to claim 5, wherein the
20 monitor (60) is a touch screen type monitor.

21 10. The multi-window monitoring system according to claim 6, wherein the
22 monitor (60) is a touch screen type monitor.

23 11. The multi-window monitoring system according to claim 7, wherein the
24 monitor (60) is a touch screen type monitor.

- 1 12. The multi-window monitoring system according to claim 8, wherein the
- 2 monitor (60) is a touch screen type monitor.